THESIS

ON

THE VALUE OF ALCOHOL IN DISEASE

By

John Beckett MB; CM.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

There are few subjects of greater practical importance to the general practitioner, than a clear and scientific knowledge of the principles which ought to guide him in the administration, or withholding, of alcohol.

That, up till a comparatively recent period, this remedy was used with somewhat too free a hand, is now more or less universally admitted. At the present day, however, a reaction appears to have set in against the use of alcohol, and this, like other reactions, is already showing signs of going too far in the opposite direction. Especially is this the case in regard to certain opinions advanced by Dr Richardson. Some of his latest utterances in public* are particularly unguarded, and will, we fear, by laying him open to the charge of fanaticism, do more harm than good to the cause he has so earnestly espoused.

We commenced practice with very strong

* He is reported to have said at Oxford that there "was no evidence whatever of any useful service being rendered by the agent"

prejudices, (resulting from education and surroundings) against the medicinal use of alcohol; but we have been compelled to admit, as the result of clinical observation of its effects, that in certain cases, and given at the proper time, no more valuable remedial agent is at the command of the physician.

In this paper we propose to examine some recent generalizations on the subject, and to show wherein they agree with, or differ from, our own ideas and experience.

A Leading article appeared lately in the British Medical Journal (Mar. 10th) on the "Relation of Alcohol to Medicine" The writer there attempts to lay down a principle concerning the right time for the administration of alcohol in disease. This he founds upon the physiological fact that alcohol paralyzes the vaso-motor nerves, so causing dilatation of the arterioles; and the conclusion

dram is that "alcohol will do harm in the febrile stages of the pyretic disorders, but it will prove useful in the subsequent spanaemic and depressed stages"

Dr E Tebbels afterwards wrote, contradicting this conclusion as not coinciding with his experience, and stating that alcohol "is especially valuable in fevers, during the greatest elevation of temperature and acceleration of pulse". On the one hand, then, we have the teaching of Science, that alcohol acts by paralysing the vaso-motor system of nerves, and that theoretically it can do nothing but harm in the congestive stages of acute disease; whilst on the other hand the practical physician assures us that he administers alcohol in fever and pneumonia, with the effect of lowering temperature, and reducing the frequency of the pulse. How is it possible to reconcile these apparently conflicting opinions?

It is, we think, by a consideration of the influence which the altered condition of the system, implied in disease, has in modifying the action of remedies -

That there are many drugs whose action on the body in a state of disease, differs from that which they exert on the body in health, is well Known. Most remedies when given in health are observed to act specially on some particular tract of the body, and in derangements of such tracts they are found to exercise upon them a corrective or restorative influence. The physiological action points out the direction in which we may look for the therapeutical action, but does not necessarily predicate the exact nature of that action. For instance, the physiological effect of Ipecacuanha is to produce nausea and vomiting, and, in larger doses, purging. Therapeutically it is most efficacious in checking vomiting, and in controlling the

diarrhoea of children; indeed we have often been surprised to find how rapidly this agent soothed down an irritable condition of the stomach and bowels. In large doses, again, it is a valuable remedy for dysentery. But, to return to alcohol, we would put the matter thus:- Alcohol appears to exert a special influence on the vaso-motor system of nerves, its effect, in health, being to paralyse them, in a greater or less degree; but, in acute disease, its action is modified in accordance with the then condition of these nerves. There can be no doubt that, in health, alcohol lessens arterial tension by removing the inhibitory influence of the vasomotor nerves, but it is equally certain that in fever and pneumonia, when the arterioles are relaxed, (as shown by dicrotism) alcohol increases arterial tension. This fact is borne testimony to, by Stuske, Ringer and others.

Let us now consider the influence of alcohol on the heart itself.
It appears to act as a tonic to that organ; and, like other tonics, it requires a departure from the standard of health in order best to manifest its beneficial action. When 2 oz of alcohol are taken by a healthy individual, the frequency of the heart's action is increased, and its contractions are rendered more powerful. The former effect may be attributable either to the direct action of alcohol in paralysing the inhibitory apparatus of the heart, or, indirectly, to its action in producing arterial relaxation. As we understand it pressure in the arterioles acts as a stimulus to the medulla, and this, being communicated to the vagi, tends to restrain the heart's action. Now, when the blood-pressure falls, consequent upon a dose of alcohol this stimulus is lessened or removed, and the heart is allowed to run on, uncontrolled by the inhibitory

influence of the vagi.

It is, however, when the heart is weakened by disease, and flagging from over-exertion, that the power of alcohol to strengthen its contractions becomes especially apparent. When it is borne in mind, that, in fatal fevers, death is to be apprehended from failure of the heart's action, and obstruction of the capillaries, it must be evident that in these cases alcohol is invaluable for its power of sustaining the heart, and maintaining the capillary circulation.

Should alcohol, then, be discarded in acute disease, merely because its physiological effect is to dilate the arterioles, and to increase the frequency of the pulse?

We think not: and shall endeavour, for the following reasons, to prove that such an inference is unjustifiable.

1st. It is contrary to analogy. This we shall attempt to show, by a reference to two agents which we select — the one, for its action on the

heart - the other, for its action on the vessels.
(a) The primary effect of Belladonna in health is to increase the frequency of the pulse to the extent of 50 or 60 beats per minute But when the heart is weakened by disease the effect of this drug is to reduce the frequency and increase the strength of the heart's action (Ringer) Moreover we do not hesitate to administer Belladonna in congestive headache, delirium of Typhus, Erysipelas etc - conditions in which the physiological effects of the drug would have led us to fear that it would do harm
(b) Nitrite of Amyl, which may be looked upon as the representative of the class of arteriole-relaxing agents has been found of great use in preventing or lessening those attacks of flushings, with which some women (about the change of life) are afflicted (Ringer) And this is the drug which, of all others, might, (by inference from its physiological action) have

been suspected of aggravating that condition of the circulation -

2nd. It is contrary to experience - For we find clinically, that in fevers and inflammations especially of a low type, alcohol produces on the heart and circulation those very changes which are most desirable and conducive to the restoration of healthy action viz. it reduces the frequency, at the same time that it increases the force, of the cardiac contractions (thus giving more time to the heart for rest) and it raises arterial tension.

3rd It must be remembered that alcohol belongs to the class of Stimulants, and these agents according to Anstie "restore flagging vital action, check excessive or irregular movements, muscular, secretory, circulatory" We have noted also a definition of Stimulants as "those agents which correct economize or intensify the forces of the system" In short, they seem to act by moderating excesses, or increasing defects,

vital actions We must not, therefore, suppose that alcohol will act in a uniform manner under all circumstances. Given in health its effect is to upset the balance of the circulation Given in disease, with the circulation accelerated and irregular, it tends to equalize it and to restore it to a more natural speed.

What is the effect of alcohol on the temperature in febrile diseases?

From what we have seen to be the action of alcohol on the circulation, in these diseases, we might naturally anticipate that it would reduce temperature. For in pyrexia, with a quickly-acting heart there is increased circulation of arterial blood, and therefore increase of the chemical changes already going on too rapidly. It may be taken as proved that alcohol actually does reduce temperature Observers agree as to the fact, but differ somewhat in regard to the

quantity necessary to produce this effect. Dr Ringer while admitting that alcohol slightly reduces temperature says "but its efficacy in this respect is so insignificant and doses so enormous must be taken to produce even trifling results that it is useless to give alcohol solely with this intention." From the observation of a variety of cases in which alcohol has been of service in lowering temperature we are inclined to differ from Dr Ringer here. We shall cite one of these:- M. J. at 62 suffering from pyrexia following amputation of foot. Eight days after operation the temperature rose to 103° at 4 p.m. One ounce of Whisky was given and at 5 p.m. (an hour afterwards) the temperature had fallen to 101° A similar quantity was administered at bedtime with the effect of producing sleep (then very much wanted), and in the morning the thermometer stood at 99·5. Towards the afternoon the temperature rose a

degree but after the exhibition of a similar dose it was again brought down. She continued to take an ounce of whisky thrice in the 24 hours with the result that the temperature returned to normal in two days from the time the stimulant was commenced. The effect on the pulse here was most marked. From being soft, compressible and very intermittent, it became slower, firmer and more regular. Now in this case the quantity of alcohol given for each dose was less than half an ounce (as whisky contains only 43% of alcohol) and the amount required to produce its physiological effects is two ounces. The dose, therefore, could not be said to be enormous, and the effect was certainly not insignificant.

But <u>how</u> does alcohol reduce temperature in fever? Does it act in any other way than by lessening the rapidity of the circulation? We know that in fever there is excessive

metamorphosis of tissue followed by increased combustion. This gives rise to high temperature which, again, leads to further mischief. Abnormal heat quickens the heart dilates the vessels, and accelerates the circulation. It also hurries respiration and thus increases the supply of Oxygen to the already overheated furnace. We also know that this increased combustion is carried on at the expense of the fat of the body. Now it is evident that whatever will diminish the oxidation of fat, must, to a certain extent moderate the train of evils which follows upon a high temperature. This, alcohol may do, by acting as a substitute for the fat, and becoming oxidized – not, like fat, into Carbonic acid and Water – but into secondary products; thus using up the Oxygen which would otherwise have gone to the combustion of fat. The important point is, that alcohol, whilst undergoing decomposition in this manner

does not evolve heat. When alcohol is burned outside the body heat is given forth and Carbonic acid and water are formed; but when it is decomposed within the body yielding Aldehyd and Acetic acid the temperature is reduced and the amount of exhaled Carbonic acid is lessened. With regard to the latter point the testimony, we must admit, is somewhat conflicting. Dr Richardson found that in the animal, the amount of CO_2 given off (under the influence of alcohol) was diminished. Dr E. Smith found that pure alcohol increased, whereas brandy, whisky, and gin, diminished the amount of expired CO_2. We would suggest that unless these observations were conducted with the greatest care, the condition of the individual at the time—whether fasting, or having recently partaken of food—may have partly contributed to the production of these various results.—

Dr Tebbits holds the idea that alcohol acts

as a fat food. He says "it is consumed as a fat within the body and as such is valuable in fevers" He argues that on chemical grounds alcohol has some claim to be considered as a fat. because Melyl alcohol ($C^{32}H^{62}O$) the highest member of the group to which ordinary alcohol belongs. "is a solid fat at ordinary temperatures" The fatal objection to this theory is the fact of alcohol lowering temperature; for, as we know the effect of the combustion of fat within the body is to <u>maintain</u> the temperature. The only sense in which we can admit that alcohol has any title to be called a fat food is in so far as, by burning Carbon and Hydrogen it saves the more rapid combustion of the fatty portions of the body. In this way we think it more valuable in the height of acute disease than even fat itself (could it be assimilated) would be: for alcohol has the great advantage of

saving loss of nutritive material and restraining evolution of heat at the same time, whereas the assimilation of ordinary food would only supply fresh fuel to the flame.

If further proof be wanted that alcohol acts by saving fat, we would point to the effect of its habitual use in health. As a general rule those who regularly indulge in alcoholic drinks become fattened.

Is alcohol, then, a food? Food must either add to the constructive material of the body, or supply heat. Alcohol contains no Nitrogen: it therefore cannot form albuminous tissues. Neither does it produce fat. Dr Angus Smith says that the question of its making fat may be given up. And we have seen, above, that it does not promote the warmth of the body. Alcohol cannot, therefore, be considered in any respect to act as a food. How, then, can

we explain the fact of persons becoming fat under its influence? The waste products of tissue metamorphosis are urea, and fat. Dr Brunton says. "According to Voit albuminous substances such as those which compose the muscles, liver & kidneys do not undergo combustion by direct union with the Oxygen supplied by the blood, but split up so as to yield urea and fat" The urea is eliminated by the kidneys, and the fat usually undergoes further combustion into Carbonic acid and Water. Whatever lessens the supply of Oxygen, renders the combustion insufficient, and the fat accumulates in the body, often to the detriment of the tissues - as in fatty degeneration and fatty infiltration. We think it is because alcohol appropriates to itself part of the Oxygen which should properly be expended in completing the series of destructive changes, that it has an apparently fattening power. That this

action is not a healthy one may be proved by the fact that it is accompanied by decreased functional activity. The fattened individual is not really stronger — so far from that, he becomes languid and disinclined for exertion, showing that the chemical changes on which life depends, are going on less effectually, and that there is diminished production of force. We may also allude to the well-known fact that in the case of a London drayman, blown up with porter, a mere scratch is extremely difficult to heal; and contrast this with the fact that in a North American Indian, (the very type of health), a serious hatchet-wound will readily heal and often without leaving a scar —

To sum up this part of the subject:- Our opinion simply is,- that alcohol is valuable in febrile diseases for precisely the same reason that it is hurtful in health. In the former condition there is undue rapidity of chemical change, and when employed to moderate this, it acts as a

beneficial medicine; in the latter condition there is the natural play of the vital functions, to interfere with which is to operate as a slow poison.

We have thus endeavoured to show that, with regard both to its action on the heart and circulation, and to its effect on temperature, alcohol must be looked upon as a valuable remedy in febrile diseases. But we by no means consider that it is always necessary, or that its administration should be made a part of routine practice. Ordinary cases of fever get on well enough without it; and it is only when signs of prostration make their appearance that we are called upon to resort to it. Speaking generally it is chiefly valuable in fevers of a malignant type and in these it requires to be given early. It is more needed, as a rule, in Typhus than in Enteric fever, and in the former, indications for its

use arise at an earlier stage. If the patient be old, it is well to anticipate exhaustion by an early use of alcohol.

In a case of Puerperal fever, we found great benefit from alcoholic stimulation. When no food could be taken for days, brandy was not only tolerated, but had the effect of keeping up the heart's action and reducing the frequency of the pulse.

Inflammations of a mild description are best treated without alcohol, but in those of an asthenic type it is invaluable. Some consider that in inflammation alcohol tends to moderate the production of cells, and it must also be of use in promoting the capillary circulation.

We would here remark that alcohol when used therapeutically exerts a far more powerful action upon those who have been previously unaccustomed to its use than upon those who, in health, have habitually indulged

in it. The question of Age, also, has a great deal to do with the efficacy of alcohol. In the old and young the best results are, as a rule, obtainable from its use; and in these the quantities required are not large. In a case of extensive Erysipelas in an infant three weeks old, when considerable prostration had setin we found from 3 to 5 drops of brandy diluted with water, given every half hour, attended with splendid results. Here we are convinced that to have withheld the gentle stimulus would have been to allow life to flicker away; and that to have given a larger quantity would have been to snuff it out altogether.

When the question arises of the propriety of administering alcohol in a particular case, it would be well to guide ourselves by the effect produced on the temperature, pulse, and tongue. When the temperature falls, when the pulse becomes slower and more

resistant, and the tongue moistens, we may be sure that good is being done. On the other hand, when an opposite effect is produced, it indicates that the time is unsuitable for stimulation.

If, in fever delirium be present, we must feel our way very cautiously, watching the result of a few doses; for the effect of alcohol in calming or increasing delirium, is one of the best indications as to whether its use will be likely to prove helpful or hurtful.

Lastly, when the febrile symptoms begin to abate, and indications arise that healthy action is being restored, alcohol had better be altogether withdrawn, or only continued in such diminished quantities as may be needful to assist in giving a start to digestion. Then, however, when appetite and the power of assimilation naturally begin to improve, generally no artificial stimulus is required to give a relish for food, and we may well trust suitable nourishment for procuring convalescence.

On this point a warning-note is sounded by Dr Tibbits. "A strong reason for withholding it at this stage, if possible, is the great tendency of the patient to acquire a relish for such beverages and thus become a slave to the greatest of all curses, systematic drinking"

Leaving now the subject of alcohol in the treatment of the pyretic disorders we pass on to consider its relation to other states of the system -

A knowledge of the effect which the continued over-use of alcohol has in producing a condition similar to Bright's disease, renders the question of the applicability of alcohol to the treatment of that disease an important one. Bright's disease, whatever its form, presents two very characteristic conditions :-

1. Blood contaminated with the retained débris of the tissues.
2. High arterial tension

When the poison accumulates to a certain

extent in the blood, it exerts a narcotizing effect upon the nervous system, analogous to that produced by a narcotic dose of alcohol. On this ground, therefore, it is evident that alcohol can only do harm if given in large quantities, as this would be adding a poison similar in its effects to that with which the blood is already saturated. Again – as the prolonged use of alcoholic drinks leads, like the poison of Bright's disease, to degeneration of the tissues, alcohol if given at all, should not be continuously used.

Next, as to increased arterial tension. Does not this condition afford an indication for the administration of alcohol, which has the power, in health, of producing dilatation of the arterioles? We have seen that, in fever, where there is arterial relaxation, alcohol renders the arterioles more tense, but there is no evidence that in Bright's disease, with the vessels in an opposite condition, alcohol has the effect

of lessening the tension. But even although it could be shown that alcohol had this power, it could only act by giving temporary relief to a symptom, whilst probably aggravating the actual disease, for undoubtedly the fons et origo mali is poisoned blood. Another reason why alcohol should be withheld in Bright's disease – and this applies especially to cases in which the superficial arteries show evidences of atheroma – is on account of its power of stimulating the heart's action. With a hypertrophied and violently-acting heart, and a contracted state of the arterioles, there is little wonder that the extra strain should occasionally cause one of the delicate arteries of the brain, which are probably also atheromatous, to give way. Now anything approaching a physiological dose of alcohol must, by exciting the heart to still stronger contraction, greatly enhance the risk of this complication arising.

The late Dr Sebson, in his Harveian Lectures, speaking on this subject says, "There may, however, be some effect of alcohol in small doses that may render it of service in Bright's disease. In small quantities largely diluted with water and especially in certain forms, such as gin or whisky among spirits, and hock and perhaps claret among wines, it certainly promotes the action of the kidneys, and in so doing may carry away not only its own poison but a certain amount of the poison of Bright's disease." He throws out a caution however, that "if there be any cirrhosis or congestion of the liver, or any degeneration of the arteries spirit is to be altogether forbidden and every wine that contains spirit" —

The use of alcoholic stimulants in such a condition as Surgical Shock, say, for example, in Concussion of the brain, calls for the very greatest care. The important point is that the dose must be very small. The powers of

life are at a low ebb. Circulation is slow, and only a small quantity can be absorbed into the blood, when,

"The heart is sick, and all the wheels of Being slow"

Besides – an ordinary dose would act as a narcotic on the half deadened nervous centres and lead to still further depression. Beginning with 10 to 20 drops of brandy, the skilful surgeon will cautiously increase the quantity until he finds the cloud beginning to lift; when, bearing in mind the stage of reaction, suitable nourishment will take the place of stimulants.

In Children, alcohol is called for in a variety of circumstances. For instance when administering depressing drugs such as Iodide of Potassium, say in Croup or diphtheria, we have found it advantageous to support the strength, at the same time, by the exhibition of stimulants – We are sometimes consulted about children mostly between the ages of 7 and 12, who present the following condition :- They have no definite

complaint, they are simply asking. They are restless, do not care for food, and are always feeling cold. The pulse is slow, and there seems, in short, to be a lack of vital energy. These patients are benefited by the occasional use of some mild stimulant, such as claret, the small amount of alcohol in which, appears to assist the languid circulation and to give a spur to the stomach.

The experimental researches of Thudicum and Kingett have thrown some light on the action of alcohol on the brain. From these it may be gathered that after death alcohol hardens the brain and dissolves out certain of its principles; and that, unless the salts contained in the blood can prevent it from acting in the same manner during life, alcohol, if present in sufficient quantity, may directly produce disease of the brain. These considerations suggest the enquiry:- Has alcohol any therapeutic value in mental disease? Dr Bucknill in a

paper "On some relations between Intemperance and Insanity" (published in the British Medical Journal of Mar. 3rd), ventures the proposition that alcohol may occasionally be of use in the prevention of Insanity. When from continued mental overstrain, excessive grief, or hopeless misery, Insanity is threatened, he thinks that the timely and judicious use of alcohol does sometimes, by making things wear a more tolerable aspect, help to retain Reason on her Throne. To quote his own words - "by the occasional help of strong drink, a man may sometimes be able to weather that point of wretchedness upon which, otherwise, his sanity would have been wrecked." Solomon recognised this when he wrote - "let him drink and forget his poverty, and remember his misery no more" In view of the important part which alcohol plays in the production of Insanity, both directly and by accelerating the action of other causes we heartily agree with Dr Bucknill that it

could only be under very exceptional circumstances and when special indications arise that the physician would be justified in incurring the danger which its use undoubtedly involves –

And now, in conclusion: alcohol is essentially a therapeutic agent. It is a true stimulant and as such it can have no place when the body is in a state of health. If Dr Austie's definition of stimulants as "agents which tend to rectify some deficient or excessive natural action" be correct, then the rational use of alcoholic stimulants presupposes disease: in other words, there must be something wrong before they can put it right. Health is the water-line – above and below that is the sphere for alcohol. Some use alcohol as an "aid to digestion": but when digestion is bad, health is not good; and if that function be in a normal condition it requires no artificial aid.

In cases of dyspepsia you ascertain that the

patient has been in the habit of taking "just a little" stimulant because "he cannot take food without it", there is strong reason to suspect that the dyspepsia is really brought on by the stimulant, and in all probability a cure will not be effected unless entire abstinence is enforced.

But in these days of competition and high-pressure excitement, when men often compress a lifetime into a few years, there undoubtedly is brought about in the history of many individuals a state of body and mind which may well be termed one of unhealth. They get into a condition of irritation and unrest. Rest, if procurable, would be the best restorative, but get out of harness they cannot. Even sleep forsakes their pillow and refuses to be coaxed. To such sufferers alcohol comes as a real boon. It relieves fatigue and pain, calms excitement, leads to improvement in sleep, and gives increased capacity for

mental and manual toil. In short, it supplies in this abnormal condition of the system, the place which food occupies in health. The healthy man, after a hard days work, finds refreshment for his weary frame in food and sleep. Often, however, after the mind has been too long on the stretch, the system becomes unduly depressed, its natural means of recuperation are cut off — appetite fails, and assimilation is arrested. In such cases alcohol may be prescribed in moderate quantities with the effect of increasing appetite, and enabling the stomach to make use of real food. We have been told by one who has had much of trial to struggle through, that, when in a state allied to what we have been describing, there was nothing for bringing him "up to the level," like the wine use of alcoholic liquors. However, in admitting the use of alcohol in such cases we must enforce the fact that it is only given for a temporary purpose, and

insist upon its withdrawal whenever that purpose has been accomplished.
Thus with an enlightened appreciation of the powers of this medicine, we physicians, by its means besides actually saving life, occasionally may very judiciously use it as a real cordial to cheer the weary, "bind up the broken hearted", and brace the sinking sufferer to greater powers of endurance, and to nobler deeds. We may, in the words of Scripture, "give strong drink unto him that is ready to perish and wine unto those that be of heavy heart" And whilst deploring the sad havoc which alcohol makes on human life, we ought not to be blinded to the fact, that this same agent, "wrested" by so many "to their own destruction" is, nevertheless, — when applied to the purpose for which intended — conservative of life. It is placed in the hands of the physician — there let it remain: and we are confident that he may often be

enabled, by its skilful and conscientious administration, both to prolong life, and to alleviate much human suffering.